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(54) USE OF A COMPOSITE MATERIAL WITH TWO METAL COMPONENTS MADE TO REACT IN ACCORDANCE WITH A STRONGLY EXOTHERMIC REACTION INDUCED BY A SHOCK WAVE AND INTENDED FOR PART OF A BULLET

(57) Abstract

Use of a composite material with two metal components made to react in accordance with a strongly exothermic reaction induced by a shock wave and intended for part of a bullet, in particular at its tip, preferably for ammunition for automatic firearms.

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Use of a composite material with two metal components made to react in accordance with a strongly exothermic reaction induced by a shock wave and intended for part of a bullet.

The invention concerns the use of a composite material consisting of two metal components that may be made to react in accordance with a strongly exothermic reaction induced by a shock wave and intended for part of a bullet, and in particular its tip, and preferably for ammunition for automatic firearms.

Materials of the type mentioned are used in high-explosive rounds or combat heads for coating a hollow surface with their explosive charge. The bullet formed by the material present as facing or coating during detonating transformation may have an incendiary effect after having crossed the shield. The volume of pores of the material concerned is low. Under the effect of the detonating shock wave, an accompanied adiabatic compression is noted with great heating. Because of this, the ignition temperature necessary for priming the exothermic reaction is very rapidly reached.

The combining of the perforation effect with the incendiary effect in a bullet proves to be interesting because of the structure that is used more and more for flying targets. Since these targets are operating at great speeds (for example, low-altitude airplanes or flying devices) or are presenting exceptional maneuverability (as is the case for combat helicopters), they can only be effectively fought by automatic weapons when the bullets have a trajectory as flat as possible.

When the starting speed is high, this assumes a slight decrease in speed that is advantageously obtained by means of a low c_w coefficient (low cross section of undisturbed flow) and a high average density of the bullet. That is why an explosive bullet, possibly consisting of a charge forming a bullet is not suitable, but only a high density undercalibrated bullet.

The purpose of the invention is to combine the perforation effect with the incendiary effect in a bullet of the type mentioned. This problem is resolved by using a composite material with two metal components that may be made to react by a strongly exothermic reaction induced by shock wave for part of the bullet, and in particular, its tip, and preferably when it is [used for] automatic firearm ammunition.

If the material is used for the tip body of the bullet, the ignition temperature necessary for priming the exothermic reaction is obtained by the predetermined shock wave from the tip during impact and the adiabatic compression of the gases included in the pores. Advantageously, then, one can no longer use explosive charge acting on the average density of the bullet or means for

its priming. The disintegration of the tip body of the bullet and the exothermic reaction advantageously take place according to mutual subordination over time that leads to the incendiary effect proposed after perforation of an external plate of the target. The use of the material according to the invention is moreover possible for other parts of the bullet with a view to adapting it for other functions and other target structures, in other words, the material not being in any way limited to the tip body of a bullet.

Concerning the metal components that have a strongly exothermic reaction with each other with the formation of an intermetallic bond, the following may be mentioned by way of examples: Pd-Al, Ni-Al and Pt-Al. Then heat can be obtained up to 1.5 kJ/g (the reaction heat of TNT being 4.3 kJ/g). For example, the reaction heat up to 1.5 kJ/g is sufficient to heat Ni-Al above the melting temperature, which is 1638°C.

The volume of the pores necessary is assured by a process that is not to be described here.

CLAIM

1. Use of a composite material with two metal components, which are made to react according to a strongly exothermic reaction induced by shock wave, intended for part of a bullet, and in particular its tip, preferably for ammunition for automatic firearms.

Translated by:

PHOENIX TRANSLATIONS

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